

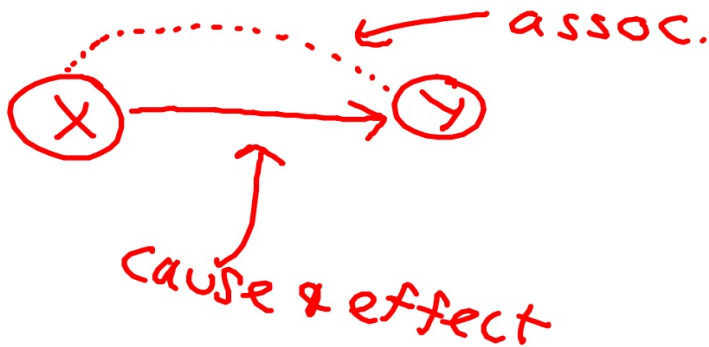
## Association vs. Causation:

x and y are  
related

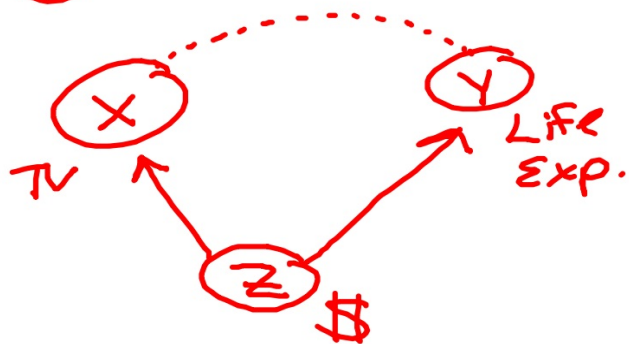
x changing  
causes y to change

association  $\neq$  causation

## CAUSATION:



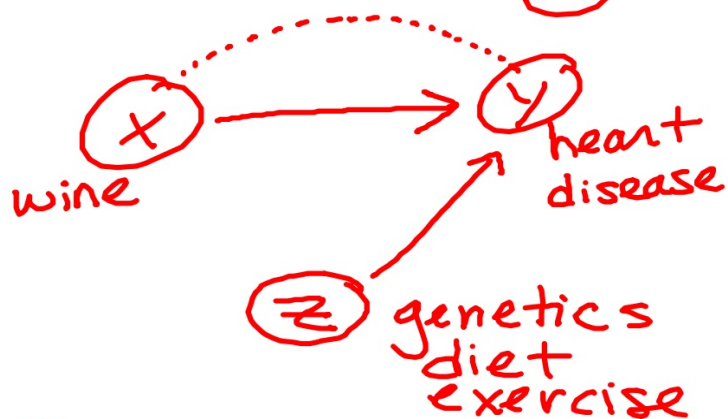
## ② Common Response:



Ex: TV Life

The assoc. is due to another variable.

### ③ Con Founding



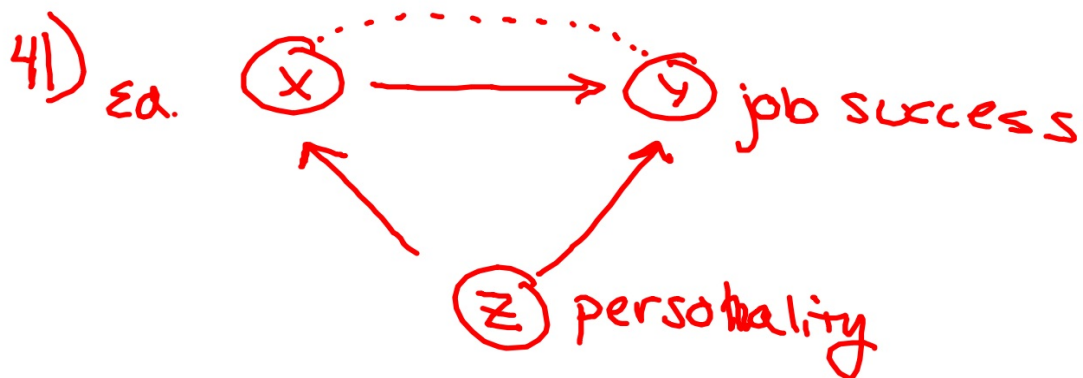
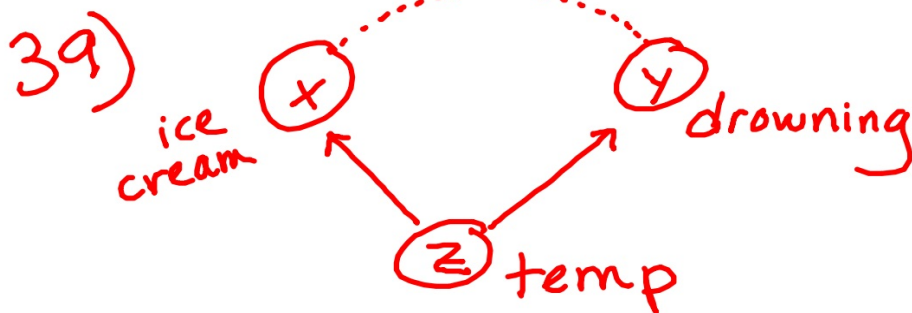
Ex: wine consumption  
vs. heart disease

X and Z  
variables are  
confounded.  
(mixed)

- Carefully designed expts.
  - in expts, control lurking variables.
- 

- assoc. is strong (high  $r$ )
- assoc. is consistent  
(as  $\uparrow x$ ,  $y$  changes)
- .... are assoc. stronger responses of  $y$
- cause  $\rightarrow$  effect is plausible.
- precedes the effect (in time)

p. 188 #39, 41



p. 191 #46

